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L2 1 SEA FILE=REGISTRY ABB=ON PLU=ON PALLADIUM/CN
 L3 5 SEA FILE=REGISTRY ABB=ON PLU=ON (1314-13-2 AND
 7440-05-3) /CRN

L4 103 SEA FILE=REGISTRY ABB=ON PLU=ON (ZN(L)O(L)PD)/ELS
 L5 7 SEA FILE=REGISTRY ABB=ON PLU=ON (L3 OR L4) AND 3/ELC.SUB
 L6 111 SEA FILE=REGISTRY ABB=ON PLU=ON (ZN(L)O)/ELS AND
 2/ELC.SUB

L7 1 SEA FILE=CAPLUS ABB=ON PLU=ON L3/CAT OR L5/CAT
 L8 1409 SEA FILE=CAPLUS ABB=ON PLU=ON L6 AND L2
 L9 690 SEA FILE=CAPLUS ABB=ON PLU=ON L8 AND CAT/RL
 L10 691 SEA FILE=CAPLUS ABB=ON PLU=ON L7 OR L9
 L11 53782 SEA FILE=CAPLUS ABB=ON PLU=ON PORE(2A) (SIZE OR VOLUME OR
 MICRON OR MU)

L12 10 SEA FILE=CAPLUS ABB=ON PLU=ON L10 AND L11
 L13 1 SEA FILE=REGISTRY ABB=ON PLU=ON RUTHENIUM/CN
 L14 1 SEA FILE=REGISTRY ABB=ON PLU=ON CERIUM/CN
 L15 1 SEA FILE=REGISTRY ABB=ON PLU=ON ZIRCONIA/CN
 L16 1 SEA FILE=REGISTRY ABB=ON PLU=ON ALUMINA/CN
 L17 4 SEA FILE=REGISTRY ABB=ON PLU=ON (7440-05-3 OR
 7440-18-8) /CRN
 AND 7440-45-1/CRN AND (1314-23-4 OR 1344-28-1) /CRN
 L18 3 SEA FILE=REGISTRY ABB=ON PLU=ON ((PD OR RU) (L)CE(L) (ZR
 OR
 AL) (L)O)/ELS AND 4/ELC.SUB
 L19 7 SEA FILE=REGISTRY ABB=ON PLU=ON L17 OR L18
 L20 2 SEA FILE=CAPLUS ABB=ON PLU=ON L19/CAT
 L21 462 SEA FILE=CAPLUS ABB=ON PLU=ON (L13 OR L2) AND L14 AND
 (L15
 OR L16) AND CAT/RL
 L22 377 SEA FILE=CAPLUS ABB=ON PLU=ON CERIUM(2A) PROMOT?
 L23 14 SEA FILE=CAPLUS ABB=ON PLU=ON L21 AND L22
 L24 84 SEA FILE=CAPLUS ABB=ON PLU=ON (L13 OR L2 OR RU OR PD OR
 RUTHENIUM OR PALLADIUM) (L) (CERIUM OR CE OR L14) (L) (L15 OR
 ZRO?
 OR ZIRCONIA OR AL2O3 OR ALUMINA OR L16) (L) PROMOT? AND
 CAT/RL
 L25 11 SEA FILE=CAPLUS ABB=ON PLU=ON
 (PALLADIUM-RUTHENIUM) (L) (ZIRCON
 IA OR ALUMINA OR ZRO? OR AL2O3) AND CAT/RL
 L26 116 SEA FILE=CAPLUS ABB=ON PLU=ON L12 OR L20 OR L24 OR L23
 OR
 L27 8937 SEA FILE=CAPLUS ABB=ON PLU=ON (STEAM OR WATER (2A) GAS OR
 L25

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8/10/2004

WATER (2A) VAPOR) (2A) REFORMING OR HYDROFORMING
L28 53 SEA FILE=CAPLUS ABB=ON PLU=ON (METHYL OR ETHYL OR PROPYL
OR ISOPROPYL OR BUTYL OR ISOBUTYL OR T-BUTYL) (L) (ALCOHOL OR
ALC) (L) REFORMING OR METHAFORMING
L29 2377 SEA FILE=CAPLUS ABB=ON PLU=ON (METHANOL OR ETHANOL OR
PROPANOL OR ISOPROPANOL OR BUTANOL OR ISOBUTANOL OR
T-BUTANOL
OR MEOH OR ETOH OR PROH OR I-PROH OR BUOH OR I-BUOH OR
T-BUOH) (L) (REFORMING)
L30 6 SEA FILE=CAPLUS ABB=ON PLU=ON (L27 OR L28 OR L29) AND
L26

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L30 ANSWER 1 OF 6 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2003:697712 CAPLUS
DOCUMENT NUMBER: 140:114038
TITLE: CeO₂-Al₂O₃-supported noble metal catalysts for
steam reforming of hydrocarbons for
fuel cells
AUTHOR(S): Zheng, Jian; Strohm, James Jon; Song, Chunshan
CORPORATE SOURCE: Clean Fuels and Catalysis Program, The Energy
Institute, and Department of Energy &
Geo-Environmental Engineering, Pennsylvania State
University, University Park, PA, 16802, USA
SOURCE: Preprints of Symposia - American Chemical Society,
Division of Fuel Chemistry (2003), 48(2), 743-745
CODEN: PSADFZ; ISSN: 1521-4648
PUBLISHER: American Chemical Society, Division of Fuel
Chemistry
DOCUMENT TYPE: Journal; (computer optical disk)
LANGUAGE: English
AB Various metals (Rh, Ru, Ir, Pt, Pd, Ni) supported on
CeO₂-promoted Al₂O₃ were studied for **steam**
reforming of liq. hydrocarbons such as jet fuel. At higher
temps., .apprx.800°, Ir/CeO₂-Al₂O₃ catalyst showed the
highest activity for **steam reforming** of lower
hydrocarbons among all the the CeO₂-Al₂O₃ supported noble metal
catalysts. However, at lower temps., .apprx.500°, Ir lost its
superiority to Rh and Ru. Ce promoted the
steam reforming of hydrocarbons by improving the
activity and coke resistance of Rh and Ir supported catalysts.
CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)

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ST Section cross-reference(s): 67
ceria alumina noble metal catalyst hydrocarbon **steam reforming**; fuel cell hydrocarbon catalytic **steam reforming**

IT Alkanes, uses
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process);

USES
(Uses)
(C12-14; noble metal catalysts supported on ceria-promoted alumina for **steam reforming** of liq. hydrocarbons for fuel cells)

IT Hydrocarbons, uses
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process);

USES
(Uses)
(liq.; noble metal catalysts supported on ceria-promoted alumina for **steam reforming** of liq. hydrocarbons for fuel cells)

IT Fuel cells
Jet aircraft fuel
Steam reforming catalysts
(noble metal catalysts supported on ceria-promoted alumina for **steam reforming** of liq. hydrocarbons for fuel cells)

IT Noble metals
RL: **CAT (Catalyst use)**; USES (Uses)
(noble metal catalysts supported on ceria-promoted alumina for **steam reforming** of liq. hydrocarbons for fuel cells)

IT 1306-38-3, Cerium dioxide, uses 1344-28-1, Alumina, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst support; noble metal catalysts supported on ceria-promoted alumina for **steam reforming** of liq. hydrocarbons for fuel cells)

IT 7439-88-5, Iridium, uses 7440-02-0, Nickel, uses 7440-05-3,
Palladium,
uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses
7440-18-8,
Ruthenium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(noble metal catalysts supported on ceria-promoted alumina for **steam reforming** of liq. hydrocarbons for fuel cells)

REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS

RECORD. ALL CITATIONS AVAILABLE IN THE RE
FORMAT

L30 ANSWER 2 OF 6 CAPLUS COPYRIGHT 2004 ACS on STN
 ACCESSION NUMBER: 2002:814702 CAPLUS
 DOCUMENT NUMBER: 137:313542
 TITLE: Integrated fuel processor, fuel cell stack, and
 tail gas oxidizer with carbon dioxide removal
 INVENTOR(S): Stevens, James F.
 PATENT ASSIGNEE(S): Texaco Inc., USA
 SOURCE: U.S. Pat. Appl. Publ., 14 pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002155329	A1	20021024	US 2002-126679	20020418
US 6682838	B2	20040127		
WO 2002085783	A2	20021031	WO 2002-US12368	20020418
WO 2002085783	A3	20021212		
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG EP 1390292 A2 20040225 EP 2002-764238 20020418 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				

NO 2003004656
PRIORITY APPLN. INFO.:
20010418

A 20031017

NO 2003-4656
US 2001-284684P

20031017

P

WO 2002-US12368

W

20020418

AB An illustrative method for converting hydrocarbon fuel to hydrogen rich gas, includes the steps of: reacting the hydrocarbon fuel with steam in the presence of reforming catalyst and a carbon dioxide fixing material to produce a first hydrogen gas; and removing carbon monoxide from the first hydrogen gas to produce the hydrogen rich gas, wherein the removing step utilizes a process selected from methanation or selective oxidn. In one illustrative embodiment the carbon dioxide fixing material is selected from calcium oxide, calcium hydroxide, strontium oxide, strontium hydroxide, and/or minerals. The reforming catalyst in one preferred and illustrative embodiment is selected from nickel, platinum, rhodium, palladium, ruthenium, or similar supported reforming catalysts or combinations of these. In such instances the reforming catalyst is preferably supported on a high surface area support thus promoting the reforming reaction and more preferably is selected from alumina, titania, zirconia, or similar such compds. or combinations of these. It is preferred that in one illustrative embodiment that the temp. of the reacting step is from about 400°. to about 800°.

IC ICM H01M008-06
ICS C01B003-34

NCL 429017000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 53

IT Exhaust gases (engine)
Fuel cells

Steam reforming catalysts

Waste gases

(integrated fuel processor, fuel cell stack, and tail gas oxidizer

with carbon dioxide removal)

IT Fuel gas manufacturing
(steam reforming; integrated fuel processor, fuel cell stack, and tail gas oxidizer with carbon dioxide removal)

IT 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses
 RL: CAT (Catalyst use); USES (Uses)
 (integrated fuel processor, fuel cell stack, and tail gas oxidizer
 with carbon dioxide removal)

IT 1314-23-4, Zirconia, uses 1344-28-1, Alumina, uses 13463-67-7,
 Titania, uses
 RL: CAT (Catalyst use); USES (Uses)
 (support; integrated fuel processor, fuel cell stack, and tail gas
 oxidizer with carbon dioxide removal)

L30 ANSWER 3 OF 6 CAPLUS COPYRIGHT 2004 ACS on STN
 ACCESSION NUMBER: 2002:64236 CAPLUS
 DOCUMENT NUMBER: 136:91503
 TITLE: Copper-free and non-noble metal catalyst for
 preparing hydrogen by oxidizing and **reforming**
methanol
 INVENTOR(S): Hong, Xuelun; Wu, Diyong; Wang, Shudong; Liu,
 Shufeng; Zhang, Peng; Qi, Aidu
 PATENT ASSIGNEE(S): Dalian Inst. of Chemical Physics, Chinese Academy
 of Sciences, Peop. Rep. China
 SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 5 pp.
 CODEN: CNXXEV
 DOCUMENT TYPE: Patent
 LANGUAGE: Chinese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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CN 1305867	A	20010801	CN 2000-110040 CN 2000-110040	20000119

PRIORITY APPLN. INFO.:

20000119

AB The catalyst is composed of active components from two of V, Cr, Mn, Zn,

Mo, Fe, Co, Ni and Ru, **promoters** from one or more of La, Ce and Y 1-10%, and an addnl. carrier 1-90%. The carrier is selected from one of SiO₂, ZrO₂ and Al₂O₃. The catalyst has high activity, selectivity, and stability for synthesis

of

hydrogen by oxidizing and **reforming** **methanol**.

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IC ICM B01J023-16
ICS B01J023-74; B01J023-76
CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)
Section cross-reference(s): 49
ST **reforming** oxidizing catalyst transition metal silica alumina
methanol hydrogen; zirconium oxide transition metal
reforming oxidizing catalyst **methanol** hydrogen
IT Oxidation catalysts
 Reforming catalysts
 (Copper-free and non-noble metal catalyst for prepg. hydrogen by
 oxidizing and **reforming methanol**)
IT 1314-23-4, Zirconium oxide (ZrO₂), uses 1344-28-1, Alumina, uses
7439-89-6, Iron, uses 7439-91-0, Lanthanum, uses 7439-96-5,
Manganese,
 uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses
7440-45-1,
 Cerium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses
7440-62-2, Vanadium, uses 7440-65-5, Yttrium, uses 7440-66-6,
Zinc,
 uses 7631-86-9, Silica, uses
RL: CAT (Catalyst use); RCT (Reactant); RACT (Reactant or
reagent); USES (Uses)
 (Copper-free and non-noble metal catalyst for prepg. hydrogen by
 oxidizing and **reforming methanol**)
IT 67-56-1, **Methanol**, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
 (Copper-free and non-noble metal catalyst for prepg. hydrogen by
 oxidizing and **reforming methanol**)
IT 1333-74-0P, Hydrogen, preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
 (Copper-free and non-noble metal catalyst for prepg. hydrogen by
 oxidizing and **reforming methanol**)

L30 ANSWER 4 OF 6 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2001:731312 CAPLUS
DOCUMENT NUMBER: 135:290842
TITLE: Reforming catalysts and methods of alcohol
steam reforming
INVENTOR(S): Wang, Yong; Tonkovich, Anna Lee Y.; Hu, Jianle
PATENT ASSIGNEE(S): USA
SOURCE: U.S. Pat. Appl. Publ., 13 pp., Cont.-in-part of
U.S.
 Ser. No. 640,903.
DOCUMENT TYPE: CODEN: USXXCO
 Patent

Henderson

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 9

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2001026782	A1	20011004	US 2001-788294	20010216
US 6488838	B1	20021203	US 1999-375614	19990817
US 6680044	B1	20040120	US 2000-640903	20000816
WO 2002066370	A2	20020829	WO 2002-US4527	20020215
WO 2002066370	A3	20030403		
			W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, BR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG PRIORITY APPLN. INFO.: US 1999-375614 A2	
19990817			US 2000-640903	A2
20000816			US 2001-788294	A
20010216			US 2002-76881	A
20020213				
AB	H is manufd. by steam-reforming MeOH over a porous catalyst contg. Pd and(or) Ru on ZnO, Al2O3, or ZrO2, optionally doped with Ce, having ≥20% pores with size 0.1-300 µm at ≥1 1.5 mol MeOH/g catalyst h. This process is useful in fuel cells.			
IC	ICM B01J008-02			
NCL	422211000			
CC	49-1 (Industrial Inorganic Chemicals)			

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ST Section cross-reference(s): 52, 67
 steam reforming catalyst methanol palladium
 zinc oxide; fuel cell hydrogen manuf steam reforming
 catalyst; cerium zirconia steam reforming catalyst
 methanol; ruthenium alumina steam reforming
 catalyst methanol

IT Steam reforming
 Steam reforming catalysts
 Synthesis gas manufacturing
 (reforming catalysts for steam reforming
 of methanol in manuf. of hydrogen)

IT Fuel cells
 Steam
 (reforming catalysts for steam reforming
 of methanol in manuf. of hydrogen for fuel cells)

IT 1314-13-2, Zinc oxide, uses 1314-23-4, Zirconia, uses
 1344-28-1, Alumina, uses
 RL: CAT (Catalyst use); USES (Uses)
 (reforming catalysts for steam reforming
 of methanol in manuf. of hydrogen)

IT 7440-05-3P, Palladium, preparation 7440-18-8P, Ruthenium,
 preparation 12014-74-3P, Cerium oxide (CeO)
 RL: CAT (Catalyst use); IMF (Industrial manufacture); PREP
 (Preparation); USES (Uses)
 (reforming catalysts for steam reforming
 of methanol in manuf. of hydrogen)

IT 1333-74-0P, Hydrogen, preparation
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (reforming catalysts for steam reforming
 of methanol in manuf. of hydrogen)

IT 67-56-1, Methanol, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (reforming catalysts for steam reforming
 of methanol in manuf. of hydrogen)

IT 7732-18-5, Water, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (reforming catalysts for steam reforming
 of methanol in manuf. of hydrogen for fuel cells)

L30 ANSWER 5 OF 6 CAPLUS COPYRIGHT 2004 ACS on STN
 ACCESSION NUMBER: 2000:815115 CAPLUS
 DOCUMENT NUMBER: 133:352477
 TITLE: Catalyst for synthesis gas manufacturing from
 methanol reforming
 INVENTOR(S): Hayakawa, Takashi; Suzuki, Kunio; Hamakawa,
 Satoshi;

Henderson

PATENT ASSIGNEE(S): Murata, Kazuhisa; Shima, Yoshitaka; Ishii, Tomoko;
 Japan; Kumagaya, Mikio
 Agency of Industrial Sciences and Technology,
 SOURCE: Sangyo Sozo Kenkyusho K. K.
 Jpn. Kokai Tokkyo Koho, 6 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000317308	A2	20001121	JP 1999-119519	19990427
JP 3243495	B2	20020107		

PRIORITY APPLN. INFO.:
 19990308

AB The **reforming** catalyst for decompg. MeOH to produce CO/H2 mixed gases comprises (i) Ce/Pd/Zr composite metal oxides of formula: $Ce_{1-x-y}Pd_xZr_yO_{2-x \cdot m}H_2O$ ($x = 0.05-0.7$; $y = 0.05-0.8$; $m = 0-10$), and (ii) hydrogenation treatment products of the composite metal oxides, by redn. with H2 at 200-600° under H2 pressure 0.05-1.5 atm. for 60-240 min to convert Pd oxides into elemental Pd. The catalyst

is durable and effective for decompg. MeOH to produce synthesis gas mainly contg. CO and H2.

IC ICM B01J023-63
 ICS C01B003-40

CC 51-9 (Fossil Fuels, Derivatives, and Related Products)
 Section cross-reference(s): 67

ST catalyst synthesis gas manufg **methanol reforming**;
 cerium palladium zirconium oxide catalyst **methanol reforming**

IT **Reforming** catalysts
 (Ce/Pd/Zr composite metal oxides-based; for synthesis gas manufg.
 from

methanol reforming)

IT Synthesis gas manufacturing
 (catalyst for synthesis gas manufg. from **methanol reforming**)

IT 92068-66-1 306769-57-3, Cerium palladium zirconium oxide
 (Ce0.6Pd0.25Zr0.15O1.75) 306769-58-4, Cerium palladium zirconium
 oxide (Ce0.7Pd0.15Zr0.15O1.85) 306769-59-5 306769-60-8
 306769-62-0

RL: CAT (Catalyst use); USES (Uses)
 (catalyst for synthesis gas manufg. from methanol
 reforming)

IT 630-08-0P, Carbon monoxide, preparation 1333-74-0P, Hydrogen,
 preparation

RL: IMF (Industrial manufacture); PEP (Physical, engineering or
 chemical process); PREP (Preparation); PROC (Process)
 (catalyst for synthesis gas manufg. from methanol
 reforming)

IT 67-56-1, Methanol, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (catalyst for synthesis gas manufg. from methanol
 reforming)

L30 ANSWER 6 OF 6 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1992:8282 CAPLUS
 DOCUMENT NUMBER: 116:8282
 TITLE: Membrane reactors for dehydrogenation
 INVENTOR(S): Imai, Tetsuya; Kuroda, Kenosuke
 PATENT ASSIGNEE(S): Mitsubishi Heavy Industries, Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 03217227	A2	19910925	JP 1990-12645 JP 1990-12645	19900124

PRIORITY APPLN. INFO.:

19900124

AB The reactor is equipped with a feed inlet, a product outlet, a H-removing device consisting of a porous metal catalyst holder with 0.1-20 μm pores having a Pd-based H-sepn. membrane with thickness $\leq 50 \mu\text{m}$ at least partly on the surface, a catalyst, and a heating device placed outside. Thus, SUS 304 powder with av. diam.

1 μm was molded into a pipe (outside diam. 10 mm, inside diam. 8 mm, length 500 mm) with av. pore diam. 0.5 μm , metalized with Pd on its outer side to 10 μm thickness, filled with a catalyst with av. diam.

1 mm contg. 20% NiO and 80% Al₂O₃; placed in a reactor, and the catalyst was

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reduced with H at 500°. Reforming of a 1:3 (mol) CH₄-H₂O mixt. in the membrane reactor at 5 kg/cm² and 500° with Ar as sweep gas proceeded with 95% conversion of CH₄ vs. 24% in the absence of the Pd membrane.

- IC ICM B01J008-02
ICS C07C005-333; C07C011-00; C07C015-46
ICA B01J023-74; C01B003-26; C01B003-38; C01B003-58; C07B061-00
CC 47-3 (Apparatus and Plant Equipment)
Section cross-reference(s): 45, 51
- IT **Reforming**
(steam, of methane, membrane reactors for)
- IT 1314-13-2, Zinc oxide (ZnO), uses
RL: CAT (Catalyst use); USES (Uses)
(catalyst, contg. alumina and calcium oxide and potassium chromate and potassium sulfate, for dehydrogenation of ethylbenzene, membrane reactors contg.)
- IT 7778-80-5, Potassium sulfate, uses
RL: CAT (Catalyst use); USES (Uses)
(catalyst, contg. alumina and calcium oxide and potassium chromate and zinc oxide, for dehydrogenation of ethylbenzene, membrane reactors contg.)
- IT 7789-00-6, Potassium chromate
RL: CAT (Catalyst use); USES (Uses)
(catalyst, contg. alumina and calcium oxide and potassium sulfate and zinc oxide, for dehydrogenation of ethylbenzene, membrane reactors contg.)
- IT 1305-78-8, Calcium oxide, uses
RL: CAT (Catalyst use); USES (Uses)
(catalyst, contg. alumina and potassium chromate and potassium sulfate and zinc oxide, for dehydrogenation of ethylbenzene, membrane reactors contg.)
- IT 1308-38-9, Chromia, uses
RL: CAT (Catalyst use); USES (Uses)
(catalyst, contg. alumina, for dehydrogenation of butane, membrane reactors contg.)
- IT 7440-06-4, Platinum, uses
RL: CAT (Catalyst use); USES (Uses)
(catalyst, contg. alumina, for dehydrogenation of propane, membrane reactors contg.)
- IT 1313-99-1, Nickel oxide (NiO), uses

IT RL: CAT (Catalyst use); USES (Uses)
 (catalyst, contg. alumina, membrane reactors contg., for steam
 reforming of methane)

IT 1344-28-1, Alumina, uses
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst, contg. nickel oxide, membrane reactors contg., for
 steam reforming of methane)

IT 7732-18-5, Water, vapor
 RL: USES (Uses)
 (in reforming of methane, membrane reactors for)

IT 7440-05-3, Palladium, uses 12665-15-5 50941-20-3
 RL: USES (Uses)
 (metalized on porous catalyst holder, reactors contg., for
 dehydrogenation of hydrocarbons)

IT 74-82-8, Methane, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (reforming of, by steam, membrane reactors for)

>=